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ABSTRACT

This study examined the reliability and validity of self-reported survey data on instructional practices. It was based on a nationwide survey of more than 25,000 teachers in more than 1,000 schools across 5 years. The survey instrument was the Classroom Instructional Practice Scale (CIPS), which was based on the Classroom Information Sheet developed by P. Wiesz and E. Cowen (1976). Although self-reported survey data might not capture the quality of the interaction between teachers and students, this study shows that survey data provide a fairly accurate description of how often teachers use various instructional practices that are consistent with the recommendations of several reform initiatives. There was consistent and solid agreement between what teachers reported and what students perceived in terms of their classroom activities. CIP scales were positively related to student achievement in mathematics. Survey results also suggest that grouped items, measuring the same underlying characteristics, provide more reliable measures of instructional practices both empirically and conceptually. Researchers proposed eight dimensions of quality instruction, and the factor structures of these dimensions were stable over 5 years. The hypothesized model fit the data well. As policymakers focus on assessing instructional trends, it is not plausible to rely on in-depth studies of a small number of classrooms. Survey data will provide the most cost-effective way of measuring national trends in instruction. (Contains 7 tables and 16 references.) (SLD)

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Multi-dimensional Assessment of Classroom Instructional Practice: A Validity Study of the Classroom Instructional Practice Scale (CIPS)

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Introduction

Recent efforts for educational reform have brought our attention to changes in instructional practices. Educators and policymakers are interested in identifying the instructional practices that "work" in improving student performance (Brophy and Good, 1986). This has led to current enthusiasm for educational standards in several curriculum areas (National Council of Teachers of Mathematics, 1989; National Council of Teachers of English, 1996). To monitor the impact of such efforts, we need accurate data on instructional practices. Much of the data on instructional practices are self-reported by teachers, and traditionally of questionable quality (Burstein, McDonnell, Van Winkle, Ormseth, Mirocha, & Guitton, 1995). As Burstein et al. (1995) argued, little effort has been made to validate whether the national survey data measure the complex procedure of classroom instruction. This explains why many studies on instructional practices have depended on in-depth case studies from a handful of classrooms. It is hardly possible to generalize the findings to other classrooms. The limited generalizability of case studies becomes more problematic as policymakers need to understand the impact of reforms in our educational system. For that reason, survey data, a cost-effective way to include a large number of classrooms are very appealing. Few studies, however, have examined the validity of the self-reported data on instructional practices although they have often been used to determine the impact of educational reforms. Mayer (1999) called for more research on the issues of survey reliability and validity. The purpose of this study is to obtain evidences of the reliability and the validity of a self-reported survey inventory designed to assess the degree to which teachers implement recommended instructional practices in the classroom.

Data and Method

A large-scale survey was developed to examine the degree to which a broad range of recommendations for effective school reform are implemented in a school as well as to examine

more fully their impact on students and staff. Among a variety of sections which examine dimensions of whole school reform, the survey has one section that asks questions on the frequency with which each teacher uses instructional practices based on the recommendations of nationwide reform initiatives on middle grades (Turning Points, 1989) and national curriculum standards (NCTM, 1989; NCTE, 1996). Teachers reported the frequency with which they used various instructional practices using a 7-point scale with the following response categories: "never", "several times a year", "monthly", "several times a month", "weekly", "several times a week", and "daily". The Classroom Instructional Practice Scale (CIPS) was originally developed from the classroom routine section of the Classroom Information Sheet (Wiesz & Cowen, 1976) as well as further items that were written by the authors to assess specific middle school practices. In 1992-93, extensive factor analyses were done with 37 middle schools in Illinois. Eight sub-scales consisting of 56 items emerged as distinct empirical factors (see Table 1). These were also validated by the conceptual judgment of a panel of experts¹. By 1996-97, the number of participating schools was increased from 39 schools in Illinois to 401 schools in 16 states. Data for this study were drawn from the survey administered to a large number of teachers and students in middle grades across 5 years (1992-93 to 1996-97). Only the teachers who teach middle grades (grades 6 to 8) in typical middle grade schools (6-8, 7-8, 5-8, 7-9, etc.) were selected². In addition, only the classroom teachers who teach "core" subject areas were selected as we found that instructional practices in non-core subject areas were quite different from those in core subjects³. Table 2 shows the characteristics of the teachers included in the study across years.

Research for the study was conducted with three different statistical techniques: Factor analytic study, reliability study and correlational study. First, the exploratory factor analyses were conducted to identify conceptually meaningful dimensions of CIPS. Factor structures can vary due to

sampling fluctuation and differences in factor analytic procedures. Therefore, considerable attention was given to the stability or robustness of CIPS factor structures over time. A series of confirmatory factor analyses was also conducted to see whether the proposed measurement model adequately fit the sample data (Byrne, 1994). Second, the reliability analyses were conducted to examine the internal consistency in teacher responses using coefficient alpha statistics (Cronbach, 1951). Coefficient alpha was selected because the items on the survey were scored polytomously. Last, correlations between teacher report and student report of instructional practices, and correlations between teacher report of instructional practices and student achievement⁴ were examined to provide evidence of criterion-related validity of instructional practice measures.

Results

Factor analyses

Oblique rotation of 7, 8, and 9 factors was undertaken for 1992-93 data. The eight-factor solution afforded the psychologically most meaningful interpretation of the empirical dimensions of the instructional practice construct. Eight-factor solution was applied to the data for later years to see whether the factor structures were stable across years. The factor loadings in 1992-93, 1994-95 and 1996-97 are presented in Table 3⁵. Most of the factors were clean and readily identifiable. Although some items were loaded on multiple factors in later years, extracted factors were, in general, congruent across years. When the items were loaded on multiple factors, they were classified on a conceptual basis judged by the panel of experts. The items "Students provide feedback and comments on each other's work", "Alternative/authentic assessments are employed to evaluate student learning" and "Self-paced learning materials are utilized" are examples of those cases.

Maximum likelihood confirmatory factor analyses (CFA) were employed to examine the goodness of fit of the eight CIPS scale model (Bollen, 1989; Hoyle, 1995). EQS for Windows

Release 5.7b (Bentler & Wu, 1995) was utilized to estimate the parameters of models consisting of the eight factors. Table 4 presents the goodness of fit indexes across 5 years. χ^2 goodness-of-fit statistics (Jöreskog, 1969), Nonnormed Fit Index (NNFI: Bentler & Bonnet, 1980) and Comparative Fit Index (CFI: Bentler, 1990) are reported⁶. A baseline model was employed in which each item was allowed to load on only one of the eight hypothesized latent constructs. These latent variables were allowed to covary, and residual covariances were fixed to zero. While the hypothesized 8-factor model (Model 1) did not fit the data adequately (CFI for the model ranged from .83 to .86 across 5 years), the fit indexes were sufficiently high to suggest that modification would yield models with acceptable fit (Bentler & Bonnet, 1980). As some items are closely related to each other, and some items are loaded with multiple factors, we decided to allow several items to be inter-correlated. Based on the modification indexes provided by the stepwise multivariate LaGranger Multiplier test, the final model (Model 2) with 23 correlated residuals and 6 cross-loaded items was tested. The model with correlated residuals attained a level of fit that is generally considered to be acceptable (Bentler & Bonnet, 1980): NNFI was about .90 and CFI was about .91 across 5 years.

Reliability

Having identified robust and distinctive dimension of instructional practices, we examined the internal consistency of the factorially derived CIPS scales. Table 5 shows the Cronbach's coefficient alpha statistics for 8 CIPS sub-scales across 5 years. All scales showed moderate to high level of internal consistency across years. All scales except Integration and Coverage of Health Topics and Mastery Based Assessment and Student Recognition had coefficient alpha ranged from .8 to .91. Mastery Based Assessment and Student Recognition had slightly smaller alpha than .8

(ranged from .76 to .79) whereas Integration and Coverage of Health Topics had alpha ranged from .58 to .62. This scale has only three items combined whereas other scales have 7 to 8 items. This, in part, explains the relatively low reliability of this scale. When the total instructional practice scale based on all 56 items was used, the reliability coefficient was very high across all years (approximately .95). Moreover, levels of internal consistency did not differ substantially between boys and girls, among grade levels, and among students from diverse racial and ethnic and socioeconomic backgrounds.

Correlational analyses

We also examined the extent to which teacher responses on their instructional practices were congruent with student responses. Teachers and students in grades 6,7,or 8 in middle schools were selected and their responses were aggregated at the school-level. Results on the correlations between teacher and student reports of classroom practices are reported in Table 6. Similar items were asked of both teachers and students on two CIPS scales: Small Group Active Instruction, and Integration and Interdisciplinary Practices. Table 6 shows a significant relationship between teacher and student report of the instructional practices ($p < .01$). Correlations between teacher and student reports of Small Group Instruction ranged from .52 to .66, whereas correlations between teacher and student reports of Integration ranged from .61 to .76 across 5 years. When teachers reported they more frequently utilized the instructional practices of integration and small group activities, students also reported they engaged in more activities, indicating the validity of teachers' self-reported instructional practices.

We also examined the correlation between teacher report of their instructional practices and student achievement. In order to make the relationship more comparable, we examined the

correlation between mathematics teachers' report of instructional practices and students' mathematics achievement. Achievement data were available for Illinois schools only from 1993-94 to 1995-96. Table 7 shows significant and positive correlations between instructional practices of mathematics teachers and student math achievement, especially for Small Group Instruction and Integration and Interdisciplinary Practices. They ranged from .25 to .60 for Small Group Instruction and .38 to .87 for Integration.

Summaries and discussions

This study examines the reliability and validity of self-reported survey data on instructional practices. It is based on nation-wide survey with more than 25,000 teachers in over 1,000 schools across 5 years. Although self reported survey data might not capture the quality of interaction between teachers and students, our study shows that survey data provide a fairly accurate description of how often teachers use various instructional practices that are consistent with the recommendations of several reform initiatives. There was consistent and solid agreement between what teachers reported and what students perceived in terms of their classroom activities. CIP scales were positively related to student achievement in mathematics. Instead of using individual indicators, we found that grouped items, measuring the same underlying characteristics, provide more reliable measures of instructional practices. We proposed 8 dimensions of quality instruction. They measure distinctive constructs of instructional practices both empirically and conceptually. Their factor structures were stable over 5 years and the hypothesized model fit the data well. As policymakers focus more and more on assessing instructional trends, it is not plausible to rely on in-depth studies of a small number of classrooms. Survey data will provide the most cost-effective way of measuring national trends in instruction.

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¹ Consisted of university researchers, principals and teachers.

² In preliminary analyses, we found that teachers who taught other than middle grades had somewhat different instructional practices than those who taught middle grades. We also found that having younger students at school would affect the instructional practices of teachers who taught middle grades in K-8 schools.

³ Mathematics, language art, science, social study, and reading

⁴ Only the achievement data for Illinois schools were available.

⁵ The factor loadings for other years were not reported in Table 3 as they were quite similar to those reported in the table.

⁶ χ^2 goodness of fit statistics has been criticized as being dependent on sample size. Hu & Bentler (1995) reported that ML-based NNFI and CFI performed adequately when $N \geq 250$.

Table 1. Classroom Instructional Practice (CIP) Scale

Subscales	Description
Small group active instruction	Students work in small groups to complete learning activities that require their active involvement
Community-based learning opportunities	Instructional units are designed and implemented to integrate community resources and information.
Citizenship and Social Competence Instruction	Instructional activities incorporate efforts to teach positive social attitudes and behaviors.
Integration and coverage of health topics	Learning activities are designed and implemented to integrate health information into instructional content.
Integration and Interdisciplinary Practices	Learning activities are coordinated across subject areas.
Critical thinking enhancement practices	Learning activities that help students develop and improve critical thinking skills are incorporated into instruction and evaluation.
Mastery-based assessment and student recognition	Student learning is measured against performance standards rather than the performance of other students, and is shared with the rest of the school.
Practices for heterogeneous/ multi-level	Classes are composed of students of varying abilities and utilize teaching techniques to aid instruction

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Table 2. Characteristics of Teachers in the Study

	1992-93	1993-94	1994-95	1995-96	1996-97
No. of "Core" teachers in the study	545	2453	6181	4992	8021
No. of schools in the study	37	143	361	258	401
Teaching experience	% responding				
Less than 1 year	3	4	3	4	4
1-5 years	17	20	20	22	22
6-10 years	13	14	14	16	16
11-15 years	16	12	11	12	12
More than 15 years	52	50	51	47	47
Grade level they teach					
6th	25	27	28	27	27
7th	37	36	36	37	38
8th	38	37	36	36	35
Subject area(s) they teach					
Math only	11	15	18	14	13
Science only	11	13	16	13	12
Social Study only	10	13	15	11	11
Language Arts/Reading only	27	24	26	24	21
Other subjects	41	35	35	38	43

Table 3. Factor Loadings of Classroom Instructional Practice Items Across Years

1992-93	1994-95	1996-97	
Small group active instruction			
-.75-.03-.01 .03-.13 .05-.01-.06	.73-.03 .05 .05-.17-.07 .02-.04	.82-.02-.01 .00-.08-.04-.05-.06	Students participate in cooperative learning.
-.59 .06 .11 .04-.04 .06-.03-.04	.66 .10 .11 .01-.00-.03 .05 .01	.65 .05-.11-.04 .04 .03 .04 .01	Students engage in group problem solving.
-.59 .14-.04 .05-.13 .05-.07-.08	.65 .08-.05 .06-.06 .22-.14 .05	.61 .12 .07-.02-.14 .05 .08 .13	Students work on group projects.
-.45 .10 .08 .05-.09-.04 .07 .01	.41 .08 .14 .04 .02-.07 .19-.12	.47 .05-.08-.08 .10 .15 .02-.09	Students participate in peer tutoring.
-.44 .09 .05 .05 .26 .08 .14 .01	.61 .05-.08 .11 .17 .17 .03 .09	.56 .07 .09-.02 .19 .11-.05 .17	Students engage in "hands on" learning activities.
-.41 .00 .03-.02-.33 .08 .10-.15	.55 .01 .08-.01-.19-.06 .05 .11	.52-.00-.05-.05-.12-.01-.04 .08	Assignments are given to allow students to get to know others.
-.40-.07 .04-.05-.40 .05 .11-.15	.61-.05 .03 .09-.26-.15 .11-.02	.71-.04-.03-.05-.09-.09-.09-.03	Students participate in small group discussions.
-.35 .07 .02-.01-.05 .13 .28-.04	.53 .03-.03 .02-.02 .06 .20 .04	.47 .09 .02 .00-.13 .08-.14 .07	Students work in heterogeneous ability groups to create projects.
Community based learning opportunities			
.01 .77 .01-.01-.11-.04 .05-.06	-.01 .70 .07-.04-.01 .00 .06 .13	.04 .73-.09 .04-.01-.07-.07 .04	Assignments to help students learn about community resources.
.01 .76-.00 .01-.09-.01 .03 .06	-.04 .72 .01-.04-.08 .05 .02 .09	-.01 .81-.08-.00-.02-.08-.04-.06	Opportunities provided for community experiences to expose students to different cultures and conditions.
-.02 .76-.03 .04 .05 .02 .01-.03	.02 .75 .01 .09-.00-.07-.05-.06	-.01 .74 .04-.04 .05-.02 .02-.02	Community/service learning opportunities are provided.
.06 .66 .03 .03-.15-.02 .12-.06	.08 .64 .10-.01-.04-.03-.02 .09	.02 .73-.04-.01-.02-.08-.11 .04	Projects to help students learn about community issues.
.02 .64 .01 .04 .10 .03-.04-.02	.01 .76-.04-.01 .03-.02 .01-.07	-.02 .64 .02 .01 .03 .07 .03 .01	Supervised youth service experiences in the community are a part of a student's academic program.
-.18 .57 .09-.01 .02-.05 .06-.07	.18 .46 .05 .00 .03 .13-.02 .03	.22 .25-.07-.12 .06 .12 .06 .06	Students engage in real world learning activities.
-.01 .45-.00 .19-.03 .06-.13 .07	.01 .54-.02 .12-.06-.06-.01 .03	.01 .54 .03-.05-.05 .00 .11 .09	People from the community are brought in to speak to the class.
-.10 .34 .04-.04 .07 .04 .06-.02	-.07 .37 .05 .11 .04 .01 .15-.05	.02 .47-.01 .01 .03 .05-.03-.02	Students are linked with outside adult mentors/programs.
Citizenship and social competence			
.02-.05 .87 .02 .06 .02 .01 .00	-.02-.02 .84 .04-.10 .01 .01-.09	-.03-.01-.85-.04-.01 .00-.03-.06	Personal growth and development is emphasized.
-.03-.10 .80-.01 .04 .04 .03-.03	-.02-.03 .84 .05-.08-.03 .01-.10	.01-.00-.75-.01-.07-.02-.08-.06	Social skill development is emphasized.
.11 .04 .80-.02-.06 .02-.01-.12	-.03 .03 .77 .06-.05 .08-.10-.02	-.00 .02-.73-.05-.02 .06 .03 .01	Emphasis on peer resistance / assertiveness is stressed.
.06 .11 .73-.02-.10 .00 .00-.10	.06 .10 .60 .01 .05 .06-.02 .15	.03 .05-.58-.02-.02 .11 .03 .09	Coping skills development is emphasized.
.03 .17 .63-.04-.04 .05-.08 .02	-.07 .17 .59 .02 .02 .01-.02 .13	-.03 .13-.61 .02 .04 .01 .09 .11	Citizenship development is emphasized.
-.05-.00 .63 .01 .01-.02 .11-.03	.10 .00 .54 .01 .12 .04 .12 .07	.12 .01-.55-.03 .11 .06-.05 .04	Practical applications of course materials are emphasized.
-.17-.06 .60 .06 .01 .04 .05 .06	.18-.02 .50-.04 .17 .06 .17 .06	.22-.02-.43-.01 .16 .18-.02 .02	Students are taught problem solving / decision-making skills.
.03 .05 .46 .06-.27 .09-.06-.06	-.02 .09 .49-.05-.16 .03-.02 .25	-.10 .05-.59-.02-.21-.06-.04 .13	Issues related to cultural diversity are emphasized.
Integration and coverage of health topics/activities			
-.07 .07 .10 .07 .12 .03-.05-.75	.02 .09 .05 .19 .04-.09 .11 .54	.04 .00-.06-.17 .05 .01-.11 .56	Health topics integrated as part of the broader classroom routines.
.02 .16 .23-.07 .03 .03-.14-.47	.09 .15 .20 .00 .03 .08-.10 .46	.17 .13-.21 .07-.01 .10 .11 .46	Instructional units address health issues.
-.15 .01 .03 .11 .00 .02-.07-.30	-.03 .13-.01 .17-.05-.02 .08 .21	.03 .07-.02-.10-.02 .03-.00 .27	Students participate in intramural activities.

1992-93

1994-95

1996-97

Integration and interdisciplinary practices

.03 .07 .05 .88 .05-.01-.09 .07
 -.04-.01 .01 .78-.04 .06-.11 .10
 .06 .06 .02 .61-.03 .01 .19-.19
 .01 .08-.06 .53-.05-.04 .13-.14
 -.10 .10 .05 .42-.08-.02 .12-.08
 -.02 .01-.04 .38-.13 .13 .07-.19
 -.04-.05 .18 .29-.09-.08 .15-.40

-.01 .12-.02 .82 .04 .06-.10-.10
 .01 .06 .02 .79 .06 .03-.06-.10
 .00 .03 .03 .72 .02 .06 .03 .04
 .04 .00-.01 .48-.06-.04 .01 .06
 .07-.05 .05 .60-.04-.04 .09 .12
 -.04 .03-.01 .34-.16 .07 .07 .19
 .05-.08 .16 .38-.09-.06 .06 .25

-.03 .05-.01-.88 .04 .01 .15-.05
 -.01-.01-.03-.81 .04-.03 .07-.02
 .04-.02-.00-.77-.02 .03-.02 .02
 .03 .05-.01-.38 .00 .01-.07 .10
 .09-.04-.06-.56-.06-.08-.18 .07
 .01 .07-.01-.35-.20-.02-.04 .19
 .10-.02-.04-.33-.03 .05-.23 .08

Teachers from other subjects help to plan/carry out class projects.
 Teachers from other subjects help to plan/carry out instructional units.
 Classroom curricula are integrated with topics in other subject areas.
 The class schedule is changed for instructional purposes.
 Interdisciplinary teaching materials are used.
 Use of the media center is integrated into lesson plans.
 Instructional materials focus on topics relating to early adolescent concerns and interests.

Critical thinking enhancement practices

-.16 .06-.00 .11-.64 .03-.04 .01
 .02 .00 .08 .13-.61 .04 .21 .03
 -.02 .03 .06 .05-.55-.00 .07 .08
 -.08 .03 .08 .12-.51 .10-.20 .06
 .04 .14 .14 .09-.47 .01-.02-.17
 -.29 .13 .13 .05-.39-.02 .03 .05
 -.22 .10-.02 .07-.38 .06-.08 .01
 .06 .04 .04-.05-.37 .29 .13-.06

.10 .09-.05-.00-.59 .15 .01 .07
 -.04-.03 .04 .13-.57-.03 .27 .02
 .11 .01 .11 .07-.45 .02-.04-.03
 .04 .05-.01-.02-.29 .36-.08 .22
 .01 .10 .08 .10-.20 .02-.01 .27
 .27 .04 .09 .02-.44-.01 .14-.06
 .25 .09 .05 .03-.42 .08-.06 .09
 -.04 .13 .02 .01-.24 .17 .23 .04

.18 .04-.02-.02-.60 .04 .02 .06
 .08-.05-.07-.13-.54 .10-.07-.02
 .13 .03-.08-.01-.38 .02-.10 .02
 -.00 .02-.05 .02-.43 .15 .13 .22
 -.01 .04-.10-.10-.19-.09-.10 .37
 .45 .01-.13-.06-.26 .07-.02-.15
 .35 .08-.05-.06-.26 .00 .09 .15
 .05 .15 .01-.09-.31 .27-.01-.05

Students write essay reports and papers.
 Students revise their reports and papers.
 Students write and keep journals.
 Students take essay tests.
 Students read and discuss newspaper articles.
 Students provide feedback and comments on each other's work.
 Students make speeches and/or presentations.
 Portfolios of a student's work are used as an indicator of success.

Mastery based assessment and student recognition

-.14-.10 .12-.01 .07 .60 .09 .08
 -.04 .05 .04 .05 .03 .59-.10-.04
 -.03-.05 .06 .05 .01 .57 .06-.08
 -.03-.01 .14 .03-.04 .48 .14-.03
 .09 .19-.03-.07-.06 .38-.06-.05
 -.11 .00 .10 .07-.05 .38 .30-.03
 -.07 .03 .03 .15-.10 .34-.13 .10
 .01 .03 .02-.03-.09 .32 .22-.08

.07-.10 .18 .05 .02 .39 .27-.09
 .12 .09 .26 .00-.04 .32 .05 .00
 .03-.06 .19 .13-.04 .45 .07 .03
 .06-.05 .16 .09-.01 .42 .19 .03
 -.06 .13 .04 .01-.13 .28 .14 .04
 .11 .02 .06 .05-.08 .22 .29 .11
 .08 .13-.01 .16-.19 .34-.06 .05
 -.01-.00 .06-.02-.00 .25 .33 .03

.67-.09-.11 .03 .02 .52-.11-.03
 .07 .05-.23-.04-.09 .34 .02 .01
 .05 .00-.11-.02-.02 .47-.03 .09
 .08-.05-.09 .01 .00 .53-.01 .11
 .01 .09 .02-.05-.12 .33 .08 .02
 .10 .10-.07-.05-.16 .31-.23 .00
 .04 .27-.03-.12-.14 .22 .25-.02
 -.05 .07-.03-.03-.06 .39-.05 .01

Students are given multiple opportunities to improve their grade.
 I seek student feedback on how to improve class.
 Recognition is given for good behavior.
 Students receive special recognition for exemplary work.
 Students receive an incomplete until they meet the criteria.
 Alternative/authentic assessments are employed to evaluate student.
 Student project is shared with the rest of the school.
 Students are allowed as much time as needed to demonstrate their knowledge on non-timed tests.

Instructional practices for heterogeneous grouping

-.00 .14 .08 .02-.11 .07 .55 .06
 -.27 .06 .21 .08 .02-.01 .52 .11
 -.20 .02 .25 .06 .10 .03 .52 .13

-.00 .12 .00 .01-.09 .01 .55 .00
 .28-.04 .07 .06 .02-.09 .53 .04
 .18-.06 .14 .10 .06 .02 .48 .09

-.03 .08-.04-.08-.05 .20-.44 .04
 .17 .06-.07-.01-.01 .14-.50 .03
 .16 .05-.12 .04 .04 .17-.44 .07

Students are provided materials at different grade levels.
 Strategies to facilitate learning at heterogeneous ability levels are used.
 Class activities are designed to present information in a way that matches the students' preferred learning modality.
 Additional instruction is provided to students ready to move on.
 Additional instruction is provided to students who fall behind.
 Self-paced learning materials are utilized.

Table 4. Model Goodness-of-Fit for Instructional Practice Scales

Model	Year	χ^2 statistics	DF	NNFI	CFI	Δ CFI
Model 1	1992-93	2819	1456	.82	.83	
	1993-94	5616	1456	.84	.85	
	1994-95	12203	1456	.85	.86	
	1995-96	9051	1456	.84	.85	
	1996-97	10797	1456	.85	.86	
Model 2	1992-93	2270	1427	.89	.90	.07
	1993-94	4017	1427	.90	.91	.06
	1994-95	7902	1427	.91	.91	.05
	1995-96	6009	1427	.90	.91	.06
	1996-97	7511	1427	.90	.91	.05

Table 5. Reliability of Instructional Practice Scales

Cronbach's Alpha	No. of items	1992-93	1993-94	1994-95	1995-96	1996-97
Small group active instruction	8	.88	.85	.87	.87	.86
Community-based Learning Opportunities	8	.84	.85	.85	.84	.84
Critical Thinking Enhancement	8	.81	.80	.79	.79	.79
Citizenship and Social Competence Instruction	8	.91	.90	.89	.89	.89
Integration and Interdisciplinary Practices	7	.86	.84	.82	.82	.82
Integration and Coverage of Health Topics / Activities	3	.62	.61	.60	.58	.60
Mastery-based Assessment and Student Recognition	8	.77	.78	.76	.77	.78
Instructional Practices for Heterogeneous Groups	6	.84	.82	.81	.82	.83
Total Instructional Practice	56	.95	.95	.95	.95	.96

Table 6. Correlations Between Teacher and Student Responses on Instructional Practices

Person Correlation			Student		
			Small group instruction	Integration	Combined
1992-93	Staff	Small group instruction	.517**	.262	.387*
		Integration	.398*	.758**	.702**
		Combined	.517**	.596**	.629**
1993-94	Staff	Small group instruction	.658**	.462**	.607**
		Integration	.470**	.717**	.673**
		Combined	.622**	.648**	.704**
1994-95	Staff	Small group instruction	.570**	.310**	.472**
		Integration	.464**	.672**	.651**
		Combined	.573**	.544**	.623**
1995-96	Staff	Small group instruction	.665**	.352	.573**
		Integration	.376**	.668**	.622**
		Combined	.591**	.573**	.675**
1996-97	Staff	Small group instruction	.611**	.328**	.531**
		Integration	.328**	.606**	.558**
		Combined	.540**	.533**	.625**

Table 7. Correlations between Instructional Practices of Mathematics Teachers and Student Mathematics Achievement

	1993-94		1994-95		1995-96	
	Gr 6	Gr 8	Gr 6	Gr 8	Gr 6	Gr 8
Small group active instruction	.55*	.60**	.41*	.43**	.25*	.34*
Citizenship and social competence instruction	.40	.42*	.23	.30*	.53**	.38*
Integration and interdisciplinary practices	.70**	.50*	.47**	.38**	.87**	.47**
Critical thinking enhancement	.48*	.45*	.19	.22	.57**	.35*
Instructional practices for heterogeneous groups	.24	.14	.46**	.43**	.61**	.23
Classroom Practice Total	.52*	.39	.43*	.43**	.48*	.52**
Number of Schools	16	28	30	43	26	36